REMARKS

Claims 27-51 are pending in this application. Reconsideration of this application in light of the following remarks is requested.

Rejection under 35 U.S.C. §102(b), Claim 27, 33, 36, 40-41, 47, and 49

Claims 27, 33, 36, 40-41, 47, and 49 are rejected under 35 U.S.C. §102(b) as being allegedly anticipated by Straight et al. (US Patent No. 5,567,650). This rejection is respectfully traversed.

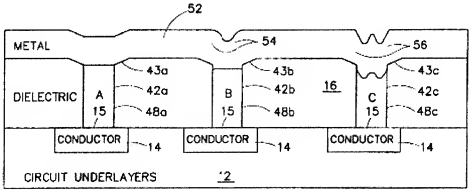
The PTO provides in MPEP § 2131 that

> *"[t]o anticipate a claim, the reference must teach every element of the claim...."*

Therefore, with respect to claims 27 and 41, to sustain this rejection the Straight reference must contain all of the above claimed elements of the claim. However, contrary to the Examiner's position that all elements are disclosed in the Straight reference, the reference does not disclose "a first conductive layer located in a substrate; and a second conductive layer located in the opening and contacting a portion of the first conductive layer, wherein an interface between the first and second conductive layers substantially conforms to a substantially curvilinear profile."

The Examiner alleges that Straight discloses these features in Fig. 6, which is reproduced below:

Fig. 6



As shown in Fig. 6, only the interface between the metal layer 52 and the tungsten plug 42C is curvilinear. The contour 43C is formed as a result of an etch back of the tungsten plug 42C. In addition, tungsten plug 42C is located within the dielectric layer 16, not in the substrate 12. Contrary to the claimed interface, the interface 15 between the tungsten plug 42C and

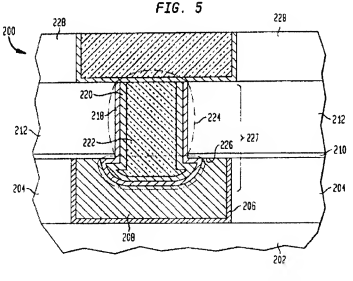
conductor 14 located within the substrate 12 is **not** substantially curvilinear. Therefore, instead of an interface between a first conductive layer and the second conductive layer that substantially conforms to a substantially curvilinear profile, Straight merely discloses an interface between a second conductive layer and a tungsten plug having a curvilinear profile. The interface 15 between the tungsten plug 43C and the conductor 14 located in the substrate 12 does not substantially conform to a substantially curvilinear profile. Therefore, Straight does not disclose each and every element of claims 27 and 41. Accordingly, the rejection to claims 27, 33, 36, 40-41, 47, and 49 are not supported by the Straight reference and should be withdrawn.

Rejection under 35 U.S.C. §102(e), Claim 27, 31-32, 36, 39-41, 45, 46 and 49

Claims 27, 31-32, 36, 39-41, 45, 46, and 49 are rejected under 35 U.S.C. §102(e) as being allegedly anticipated by Barth et al. (US Patent No. 6,613,664). This rejection is respectfully traversed.

The Examiner alleges that Barth discloses "a first conductive layer located in a substrate; and a second conductive layer located in the opening and contacting a portion of the first conductive layer, wherein an interface between the first and second conductive layers substantially conforms to a substantially curvilinear profile" in Fig. 5, which is reproduced below:

FIG. 5



As shown in Fig. 5, Barth discloses a "void-free vias 227 having a cylindrical portion 224 and a barbed portion 226." However, the conductive lines or region 208 as shown in Fig. 5 is located in a dielectric layer 204 (column 5, lines 43-44). The conductive lines or region 208 is

not located in a substrate 202. Therefore, Barth merely discloses an interface between metallic material 222 within a dielectric layer 212 and a first conductive region 208 within dielectric layer 204. Barth does not disclose any interface that is between a first conductive layer located in a substrate and a second conductive layer located in the opening and contacting a portion of the first conductive layer. In fact, no conductive layer is present within the substrate 202 according to Barth. Therefore, Barth also does not disclose each and every element of claims 27 and 41. Accordingly, the rejection to claims 27, 31-32, 36, 39-41, 45, 46, and 49 are not supported by the Barth reference and should be withdrawn.

Rejections Under 35 U.S.C. §103(a), Claims 33, 38, 47, and 51

Claims 33, 38, 47 and 51 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Barth in view of Straight. Applicants traverse this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to claims 27 and 41, from which claims 33, 38, 47 and 51 depend.

As the PTO recognizes in MPEP § 2142:

> *... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...*

It is submitted that, in the present case, the examiner has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

1. Even when combined, the References Do Not Teach the Claimed Subject Matter

Barth and Straight cannot be applied to reject claims 33, 38, 47, and 51 under 35 U.S.C. § 103(a) which provides that:

> *A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)*

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, neither Barth nor Straight, either alone or in combination, discloses or suggests "a first conductive layer located in a substrate; and a second conductive layer located in the opening and contacting a portion of the first conductive layer, wherein an interface between the first and second conductive layers substantially conforms to a substantially curvilinear profile."

Straight merely discloses an interface between a tungsten plug and the second metal layer that is curvilinear, not an interface between a first conductive layer located in the substrate and the tungsten plug. Barth merely discloses an interface between metallic and a first conductive region that are both located within a dielectric layer. There is no mention in either reference of an interface between a first conductive layer that is located within a substrate and a second conductive layer that substantially conforms to a substantial curvilinear profile. Therefore, one of ordinary skill in the art would not have been led to modify or combine the disclosures of Barth and Straight to reach the features of claims 27 and 41.

Thus, for this mutually exclusive reason, the Examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 33, 38, 47, and 51 under 35 U.S.C. §103(a) should be withdrawn.

2. The Combination of References is Improper

Assuming, arguendo, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why Barth and Straight cannot be applied to reject claims 33, 38, 47, and 51 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

> *...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.*

Here, Barth and Straight fail to disclose or suggest, the desirability of the combination of "a first conductive layer located in a substrate" and "an interface between the first conductive layer and a second conductivity layer having a substantially curvilinear profile." Since Barth only discloses a conductive region within a dielectric layer instead of a substrate, Barth does not and could not disclose an interface between the first conductive layer located in the substrate and the second conductive layer. In addition, there is no first conductive layer that is located within a substrate in Barth.

Since Straight only discloses a tungsten plug within a dielectric layer instead of a substrate, Straight does not discloses a first conductive layer located in the substrate. In addition, the interface with a curvilinear profile in Straight is not between the first conductive layer and the second conductive layer. The curvilinear interface is between the tungsten plug within the dielectric layer and the second conductive layer. Thus, it is clear that both Barth and Straight fail to provide any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

In the present case, it is clear that the Examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claims 27 and 41. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 33, 38, 47, and 51 under 35 U.S.C. §103(a) should be withdrawn.

Conclusion

It is clear from all of the foregoing that independent claims 27 and 41 are in condition for allowance. Dependent claims 28-40 and 42-51 from and further limit independent claims 27 and 41 therefore are allowable as well.

An early formal notice of allowance of claims 27-51 requested.

Respectfully submitted,

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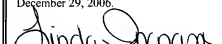

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